

## **ULTRASOUND AND COMPUTER TOMOGRAPHY IN STAGING OF PANCREATIC CARCINOMA IN PATIENT WITH CHRONIC PANCREATITIS**

Vakulenko I.P., Momot N.V., Savchenko E.A.  
Donetsk Medical University

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### **SUMMARY**

The aim of present work was to determine the possibility of ultrasound and computed tomography in the diagnosis and staging of pancreatic carcinoma in combination with chronic pancreatitis. Reliable criteria of pancreatic tumor are the following indirect signs: tumor extension to adjacent structures, lymph node involvement and distant metastases. Only interventional procedure with morphological assessment are valuable methods in diagnosis of pancreatic carcinoma in connection with chronic pancreatitis.

**KEY WORDS:** chronic pancreatitis, pancreatic carcinoma, ultrasound, computed tomography

### **INTRODUCTION**

At present time statistically and clinically proved that chronic pancreatitis is the source disease for developing pancreatic carcinoma. Pancreatic carcinoma occurs in 2-3% of patients with chronic pancreatitis [6,7,8]. Chronic pancreatitis is characterized by expressed dysplastic and disregenerated changes which lead to arising pancreatic tumor [2, 5, 7].

In Western countries pancreatic carcinoma accounts for 22% of the death due to malignant neoplasms of digestive system. This disease has an extremely poor prognosis: generally less than 20% of the patients survive during the first year and only 3% alive up to 5 years [3, 4, 8]. The radical treatment for pancreatic carcinoma is surgery. Therefore, early diagnosis and assessment of tumor resectability are important to achieve a successful treatment [1, 2, 5, 8].

The purpose of our investigation was: to determine the possibility of ultrasound and computed tomography in the diagnosis and staging of pancreatic carcinoma in combination with chronic pancreatitis.

### **MATERIALS AND METHODS**

58 patients with pancreatic carcinoma developed on the basis of chronic pancreatitis were studied by ultrasound (US), computed tomography (CT) and endoscopic retrograde cholangiopancreatography (ERCP) in combination with CT. The studied population consisted of 34 males and 24 females (age range 34-82). CT-examination was performed with oral administration of the water-soluble contrast material and intravenous injection of contrast medium. The final diagnosis of pancreatic carcinoma arising from chronic pancreatitis was confirmed by percutaneous biopsy performed under US and CT control in 16 cases and by surgical explora-

tion in 42 cases. CT-, US- and ERCP-results were compared with histopathological findings.

### **RESULTS AND DISCUSSION**

60% of pancreatic carcinomas located in the pancreatic head, 22% - in the body-tail region, 18% affected the entire pancreas.

Such diagnostic criteria as tumor location, size and density, involvement of pancreatic and biliary ducts, presents of local tumor extension, vessels encasement, lymph nodes and distant tumor metastases were described in examination protocol. Dependence of metastatic ways from location and size of pancreatic carcinoma were analyses. US and CT-symptoms which indicated to chronic pancreatitis were calcifications within the pancreatic parenchyma and stones within the dilated excretory system, pseudocysts, atrophy of pancreas. Pancreas edema, peripancreatic exudation, necrotic areas considered as criteria of activity of chronic inflammatory process.

The diagnosis of pancreatic carcinoma was based on totality of signs. Solid tumor appeared by the presence of soft-tissue masses and segmental enlargement of pancreas in 53,5%. Inhomogeneous hypodensive zones within suspected tumor were not specific for carcinoma, because it may mimic chronic pancreatitis. The differentiation between tumor's necrosis and pseudocysts arising secondary to chronic pancreatitis was performed with the help of intravenous contrast administration.

In cases of diffuse pancreatic enlargement it was necessary to differ carcinoma from chronic pancreatitis in acute stage. The tumor enlargement of pancreas unlike chronic inflammatory process was stable during two weeks after beginning of effective conservative treatment in our series.

15,5% of patients had US and CT symptoms of chronic pancreatitis in acute stage. Tumor

lesion was detected by areas of hyperattenuation which appeared after contrast injection in 5 of this cases. In 4 patients pancreatic carcinoma were diagnosed only by surgical exploration.

Malignant cystic pancreatic tumor (cystadenocarcinoma), detected in 31,0% of patients, was identified by the presence of multilocular cysts or conglomerate of cysts with irregular thick walls and septa and soft-tissue masses within. Cyst walls, septa and vascularized soft-tissue structures enhanced after contrast-media injection. Benign pseudocyst were found in 8,6%. It had regular shape, thin walls and homogenous liquor contents.

The sensitivity of US and CT in detecting pancreatic carcinoma in combination with chronic pancreatitis was 78,2% and 87,4%, specificity – 66,5% and 72% accordingly. Tumor smaller than 2 cm was not found in 3 patients.

Bile or pancreatic duct dilatation were present in 48,3% cases. The type of dilatation of the main pancreatic duct considered as criteria for differential diagnosis between pancreatic carcinoma and chronic inflammatory processes. ERCP in combination with CT provided information about the cause of pancreatic duct dilatation. Abnormalities revealed by this study included pancreatic tumors, pancreatic ductal strictures and gallstones in chronic pancreatitis.

ERCP in combination with CT demonstrated changes in secondary pancreatic ductal branches, that usually cannot be visualized by US and CT. Irregular dilatation of pancreatic duct which often consisted of retention cysts was typical for chronic pancreatitis. Abrupt termination or irregular stenosis of the pancreatic or common bile duct were interpreted as pancreatic carcinoma. It was highly specific (98,0%) but poorly sensitive (54,2%) criteria of pancreatic carcinoma.

If the stenosis of main bile or pancreatic duct were not clearly malignant, an analysis of secondary ducts caliber was performed. In particular, the visualization of secondary ducts and its saccular dilatation was considered as criteria for benign lesions.

Staging of pancreatic neoplasm were generally performed by CT. Pancreatic cancer tends to rapidly involve the adjacent structures by direct extension due to destruction of gland fibrous capsule. Local tumor spreading often occur at the time of diagnosis.

The local tumor peripancreatic extension was observed in 38,0% of cases. The posterior tumor spreading was more frequent. Tumor peripancreatic extension differed from peripancreatic inflammatory infiltration by good correlation between increase of tumor density after contrast enhancement in comparison of inflammatory infiltration and exudation.

55,2% of cases were determined as unresectable disease because of vessels encasement. Usually invasion of major arteries and veins considered as a contraindication to resection. Arterial involvement was demonstrated on US and CT by non-cleared differentiation of the vessels on background of tumor infiltration or by soft-tissue masses surrounding the vessel. Venous involvement was diagnosed because of the venous collaterales or varicies presence that was better revealed by US. Generally in venous encasement included the portal, splenic and superior mesenteric veins.

CT-signs of tumor spreading into stomach and duodenum were found in 13,8% of patients. Extension of pancreatic neoplasm into lesser sac was obtained in 13,8% cases, posterior gastric wall - in 10,3%, duodenum - in 5,2%. CT-criteria of stomach invasion were the irregular thickening and ulceration of the gastric wall and presence of soft-tissue masses in gastric lumen. Duodenal invasion was characterized by its obstruction and circular thickening of duodenal wall. The extension of pancreatic carcinoma was reliable diagnosed by CT due to the possibility of visualization of gastric and duodenal wall and intraluminal tumor growth.

Sensitivity of US and CT in evaluation of local tumor spreading was 78,6% and 85%, specificity – 84,1% and 91,0% accordingly. Method was especially specific in the diagnosis of biliary or vascular involvement.

If lymph node metastasis were presented a radical resection was abandoned in favor of a palliative procedure. Lymph node metastases were found in 18% of patients.

Tumor staging and assessment of resectability depended from regional or distant lymph node involvement. N1-stage included involvement of peripancreatic, pancreaticoduodenal, proximal mesenteric, along the common bile duct, along the pancreatic tail, in the splenic hilum (in body or tail tumors only), coeliacal (in head tumors only) lymph nodes. This nodes were found in 15,5% of patients.

Involvement of paraaortic, parasplenic, along the pancreatic tail (in carcinoma of the head), coeliacal (in carcinoma of the body or tail), considering as distant metastases (M1-stage), were found in 5,3% of cases.

The enlargement of lymph node more than 2,0 cm, multiple lymph node involvement and their margining into conglomerates were considered as highly specific for carcinoma metastasis. Lymph node with size from 0,8 to 2,0 cm were considered as suspected for tumor involvement, however it was impossible to exclude inflammatory lymphadenopathy.

Sensitivity of US and CT in detecting lymph nodes metastases was 74,0% and 78,2%, speci-

ficity –84,0% and 89,9% accordingly.

Metastases to distant organs were found in 10,3% patients: liver - in 3,5%, peritoneum - 5,2%, lungs - 1,7%. Liver metastases in majority of cases were multiple.

Conclusion: There are significant diagnostic difficulties in detecting pancreatic carcinoma in patients with chronic pancreatitis. Reliable crite-

ria of pancreatic tumor are the following indirect signs: tumor extension to adjacent structures, lymph node involvement and distant metastases. Only interventional procedure with morphological assessment are valuable methods in diagnosis of pancreatic carcinoma in connection with chronic pancreatitis.

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## УЛЬТРАЗВУКОВЕ ДОСЛІДЖЕННЯ І КОМП'ЮТЕРНА ТОМОГРАФІЯ У ДІАГНОСТИЦІ СТАДІЙ РАКУ ПІДШЛУНКОВОЇ ЗАЛОЗИ У ХВОРИХ НА ХРОНІЧНИЙ ПАНКРЕАТИТ

Вакуленко І.П., Момот Н.В., Савченко Е.А.  
Донецький медичний університет

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### РЕЗЮМЕ

Вивчалися можливості ультразвукового дослідження (УЗД) і комп'ютерної томографії (КТ) у діагностиці раку підшлункової залози у сполученні з хронічним панкреатитом та визначенням стадії пухлинного процесу. Діагностичними критеріями пухлини встановлені: локальна пухлинна інвазія в навколишні органи і структури, метастазування у лімфатичні вузли, окремі метастази. Тільки пункційна біопсія під контролем УЗД і КТ є цінним методом діагностики злоякісних пухлин підшлункової залози на фоні хронічного панкреатиту.

**КЛЮЧОВІ СЛОВА:** хронічний панкреатит, рак підшлункової залози, ультразвукове дослідження і комп'ютерна томографія

## УЛЬТРАЗВУКОВОЕ ИСЛЕДОВАНИЕ И КОМПЬЮТЕРНАЯ ТОМОГРАФИЯ В ДИАГНОСТИКЕ СТАДИЙ РАКА ПОДЖЕЛУДОЧНОЙ ЖЕЛЕЗЫ У БОЛЬНЫХ ХРОНИЧЕСКИМ ПАНКРЕАТИТОМ

Вакуленко И.П., Момот Н.В., Савченко Е.А.  
Донецкий медицинский университет

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### РЕЗЮМЕ

Изучались возможности ультразвукового исследования (УЗИ) и компьютерной томографии (КТ) в диагностике рака поджелудочной железы в сочетании с хроническим панкреатитом и определении стадии опухолевого процесса. Диагностическими критериями опухоли были: локальная опухолевая инвазия в окружающие органы и структуры, метастазирование в лимфатические узлы, отделенные метастазы. Только пункционная биопсия под контролем УЗИ и КТ является ценным методом диагностики злокачественных опухолей поджелудочной железы на фоне хронического панкреатита.

**КЛЮЧЕВЫЕ СЛОВА:** хронический панкреатит, рак поджелудочной железы, ультразвуковое исследование и компьютерная томография